

LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory, June 7-June 14, 2010

Keeping an eye on research



The artificial retina

It's not exactly Steve Austin's bionic eye from the TV show "The Six Million Dollar Man," but it may help restore sight to millions of people suffering from eye diseases.

Laboratory scientists and engineers are developing the electronics for a third-generation artificial retina as part of the U.S. Department of Energy (DOE) project to produce an "epiretinal prosthesis." The project brings together five national labs, four universities and a private company, with the Laboratory serving as the lead organization for the implantable artificial retinal system.

The LLNL team contributes three major components to the artificial retina: the thin-film electrode array that contains the neural electrodes; the biocompatible electronics package that contains the electronics for stimulating the retina and wireless power and communications; and an ocular surgical tool that will enable the insertion, attachment and re-insertion of the thin-film electrode array.

To see more, go to the KNTV video:

http://www.nbcbayarea.com/news/health/Bionic_Eye_Restores_Sight_and_Hope_All__National_.html

Origami meets rocket science



The Eyeglass 5-meter diffractive lens

The rules of math can be used to create an object of art

At least that's what Robert Lang thinks. Lang, an origami master and Lab collaborator, says that origami and science are very similar: "You're discovering patterns and relationships that, in a sense, already existed before we discovered them."

And Lang applied that to science at the Lab. About 10 years ago, he collaborated with Lawrence Livermore scientists to design a telescope lens that could go to space. Origami principles were ideal for the task because the lens, called the Eyeglass, needed to be big -- about the size of a football field -- once in space, but also small enough to be shot into orbit by a rocket.

A prototype demonstrated that hinged panes of glass could be used to compact the lens down to dimensions of no more than about 13 feet without degrading the optical performance.

To read more, go to <http://www.theday.com/article/20100525/NWS08/305259989>

A fly energy storage system



The flywheel battery system

The Laboratory is collaborating with Arnold Magnetic Technologies to develop a passive magnetic bearing system. This system is initially intended for flywheel energy storage systems, as well as other applications.

This collaboration combines research and analysis performed by LLNL's Richard Post, who has many years of experience in magnetic theory and a large portfolio of resultant inventions, along with Arnold's experience and expertise in design and manufacturing of high-performance magnets and precision magnetic assemblies.

Passive magnetic bearings are currently used today, in limited quantity, in uninterruptible power supplies, such as flywheel energy storage systems, as well as couplers, motors, compressors, generators, magnetic levitation transportation and even medical devices.

To read more, go to

http://www.goodcleantech.com/2010/06/developing_passive_magnets_for.php

Combating radiological threats at sea



California Department of Fish and Game and San Diego Fire Rescue Lifeguard Service prepare to board a simulated threat vessel at the entrance to Mission Bay.

More than 130 trained maritime law enforcement and first responder personnel from federal, state and local agencies, including scientists from LLNL participated in an operational maritime exercise in San Diego as part of a larger state of California Golden Guardian 2010 exercise late last month.

The exercise consisted of three separate operations. Maritime law enforcement and first responders conducted small vessel radiological screenings at two security zones in San Diego, Bay and Mission Bay.

Lawrence Livermore team members used portable hand-held radiation detection equipment to locate and identify industrial-type, low-level radiation sources placed on small vessels as part of the exercise.

To read more, go to

<http://www.bizjournals.com/sanfrancisco/stories/2010/05/31/daily24.html?surround=lfm>

A gift for the community



Lawrence Livermore National Security, LLC (LLNS), which manages the Laboratory, is kicking off its annual Community Gift Program to benefit local and area nonprofit organizations for 2010.

The program provides up to \$100,000 in funding to support organizations addressing science, technology, engineering and/or mathematics (STEM) education, community-service and philanthropic needs in communities having a large population of Lawrence Livermore National Laboratory employees. Nonprofit California educational institutions, IRS-qualified 501(c)(3) organizations, and government agencies serving Alameda, Contra Costa and San Joaquin counties are eligible to apply. Gifts will be awarded in amounts from \$1,000 to \$20,000.

All organizations interested in applying to the LLNS Community Gift Program must submit a gift application to LLNS by Aug. 2, 2010. To be eligible, organizations must be sustainable and financially viable and accountable for spending and program results. All applicants will be notified of the outcome of their proposal by Sept. 13, 2010.

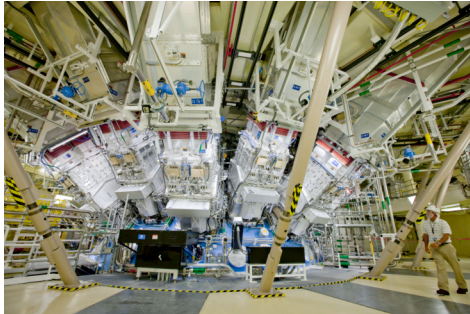
To read more, go to <http://www.llnslc.com/communityGiving/llnsgift.asp>

Latest *Newsline* available



Newsline provides the latest Lab research and operations news. See the most recent issue at <https://newsline.llnl.gov>

Photo of the week



A star is born: The National Ignition Facility's target chamber is the place where experiments to create a star (fusion) in the laboratory will take place. Fusion experiments are scheduled for later this year.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

The *Livermore Lab Report* archive is available at:
https://publicaffairs.llnl.gov/news/lab_report/2010index.html